(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 13 May 2004 (13.05.2004)

PCT

(10) International Publication Number WO 2004/040207 A1

F25B 15/02. (51) International Patent Classification7: F28D 7/00, F28F 1/02, F16K 11/00, F25B 41/04, 39/00

(72) Inventor; and

(75) Inventor/Applicant (for US only): GUERRA, Marco

(21) International Application Number:

[IT/IT]; Via San Martino, 22/A, I-24100 Bergamo (IT).

PCT/IT2002/000793

(74) Agents: KRATTER, Carlos, et al.; c/o Ing. A. Giambrocono & C. S.R.L., Via R. Pilo, 19/B, I-20129 Milano (IT).

(22) International Filing Date: 16 December 2002 (16.12.2002)

(81) Designated States (national): JP, US.

(25) Filing Language:

Italian

(84) Designated States (regional): European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR).

(26) Publication Language:

English

Published:

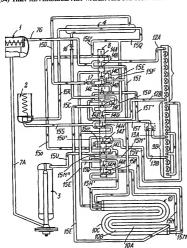
(30) Priority Data: 30 October 2002 (30.10.2002) IT MI2002 A 002309

with international search report

(71) Applicant (for all designated States except US): ROBUR S.P.A. [TT/IT]; Via Parigi, 4/6, I-24040 Verdellino/Zingonia (IT).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: REVERSIBLE AIR-WATER ABSORPTION HEAT PUMP



(57) Abstract: A cooling or heating device in an absorption heat pump of GAX type, comprising a generator (1), a heat exchanger (2) of GAX type, an absorber (9B, 10B, 10C), a condenser (9A, 10A), an evaporator (10A-C, 9B), a pump (3) connected to said absorber and generator, a first circuit (15A-Z) for the refrigerant solution circulating through the device and connecting together at least said generator, GAX heat exchanger, absorber, condenser, evaporator and pump, and valve means (8) for modifying said first circuit (15A-Z) such as to vary the manner in which evaporator, absorber, condenser and evaporator are connected together, in which at least a first and a second heat exchange means (9, 10) are provided to enable at least one phase of the solution circulating through said means to be changed and to enable thermal energy to be exchanged against an external fluid, said first and second heat exchange means (9, 10) each comprising at least two mutually separate sub-heat exchanger (9A-B, 10A-C) arranged to function either as an evaporator or as an absorber and condenser, depending on the operating mode of the device.

WO 2004/040207 A1

Ini ional Application No

IN ⁻	TERNATIONAL SEARCH REPORT			T 02/00	793		
	F25B15/02 F28D7/00 F28F1/02 F25B39/00 F28D7/00 F28F1/02	F16K11/	/ 00	F25B41/	' 04		
	International Patent Classification (IPC) or to both national classification an	d IPC					
Minimum doc	cumentation searched (classification system tollowed by classification system)	DOIS)					
IPC /	F25B F28D F28F F16K Ion searched other than minimum documentation to the extent that such do		cluded in t	he fields searc	hed		
1							
Electronic d	ata base consulted during the International search (name of data base and	, where practi	Jas, Bearen	(CITILD GOV -)			
EPO-In	ternal						
C. DOCUM	C. DOCUMENTS CONSIDERED TO BE RELEVANT						
Category *	Citation of document, with indication, where appropriate, of the relevant	passages			Relevant to claim No.		
A	WO 01 50075 A (ROCKY RES) 12 July 2001 (2001-07-12) page 2, line 7 -page 5, line 19; fi	gures			1		
	1-5				1-4,6,7,		
A	US 4 437 321 A (ASAI SETSURO) 20 March 1984 (1984-03-20) column 6, line 4 -column 7, line 58	3; claim			14		
	1; figure 1				1,14		
A	US 5 174 129 A (KONDO MASAYUKI) 29 December 1992 (1992-12-29) column 1, line 10 -column 1, line figure 4	53;			1,14		
A	US 3 527 060 A (KRUGGEL ROY W) 8 September 1970 (1970-09-08) the whole document	'			1,4,7		
			femily mer	nbers are liste	d in annex.		
110	Further documents are listed in the continuation of box C.				a am dela		
'A' do	oument defining the general state of the art which is not considered to be of particular relevance artier document but published on or after the international	cited to un invention X* document of cannot be	derstand the of particular considered	relevance; the novel or can	ternational filing date in the application but theory underlying the a claimed invention to be considered to document is taken alone		
1.0.4	illing date counters which may throw doubts an priority claimte) or which is clied to establish the publication date of another distallation of other special reason (as specially counters releasing to an oral disclosure, see, withbillion or different reasons and disclosure the priority of the priority of the priority of the priority and disclosure the priority of the publication of the priority of the priori	'Y' document or cannot be document ments, su in the art.	of particular considered is combine ich combine	relevance; the distribution to involve and with one or ation being ob-	inventive step when the more other such docu- vious to a person skilled		
P	later than the priority date claimed	Date of m	naling of the	e International	search report		
Date	of the actual completion of the international search 19 March 2003		/04/20				
-	to and mailing address of the ISA	Authorize	ed officer				
Nam	te and maning accretes to the 13-4 European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (431–70) 340–2040, Tx. 31 651 epo nl, Fax. (431–70) 340–3016	Sz	ilagyi	, B			



Inj ional Application No PCT/IT 02/00793

	INTERNATIONAL SEARCH REFORT	PC1/11 02/00	
Continua	INTERNATION DOCUMENTS CONSIDERED TO BE RELEVANT	Rel	evant to claim No.
Category *	Citation of document, with indication, where appropriate, of the relevant passages		
1	EP 0 911 597 A (FIN ROBUR S A P A DI BENITO GU) 28 April 1999 (1999-04-28) paragraph '0012! - paragraph '0022!; claims 1-3,6; figures 1-3		7–10
A	US 3 693 661 A (AURENGE JACQUES ET AL) 26 September 1972 (1972-09-26) abstract; figures 1-3		12,13
A	GB 2 233 428 A (WILLIAMSON ALASDAIR JAMES;WILLIAMSON DAVID THEODORE NELS) 9 January 1991 (1991-01-09) abstract; figure 1		12,13

INTERNATIONAL SEARCH REPORT

information on patent family members

tni tonal Application No PCT/IT 02/00793

		mornac	011 011 P			101/11	02,
Patent document		Publication date		Patent family member(s)		Publication date	
	in search report 0150075	A	12-07-2001	AU CN EP WO	292720 139427 124489 015007	1 T 0 A1	16-07-2001 29-01-2003 02-10-2002 12-07-2001
US	4437321	Α	20-03-1984	JP DE	5804546 323364	8 A 9 A1	16-03-1983 31-03-1983
US	5174129	A	29-12-1992	JP JP	252854 408408		28-08-1996 17-03-1992
115	3527060	Α	08-09-1970	NONE			
	0911597	A	28-04-1999	IT EP	MI9723 09115	80 A1 97 A2	10-03-1998 28-04-1999
US	3693661	A	26-09-1972	FR DE GB	20559 20401 12930	13 A1	14-05-1971 25-02-1971 18-10-1972
G	B 2233428	Α	09-01-1991	NONE			